Hospital Use in Massachusetts, 1945–1955

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DETAILED information concerning hospital use is urgently needed at a time when construction and operation costs of hospitals continue to rise. How has the shift of population in metropolitan areas from the core cities to suburbia influenced hospital utilization in medical teaching centers and institutions located in central areas? Why do some communities have higher rates of hospitalization than others? And, finally, are we prepared to develop criteria for determining reasonable or adequate levels of utilization?

To begin to answer these and related questions, a survey of hospital use in Massachusetts in 1955 was compared with a similar study undertaken 10 years previously when hospital service areas were first drawn up for the Federal hospital survey and construction program. Data on hospital admissions for the State's entire population residing in 351 cities and towns were gathered from the 163 general hospitals caring for acutely ill patients in 1945 and from the 149 such hospitals in 1955. All inpatient admissions with the exception of the newborn were counted. Data for the newborn were collected separately and were used to represent maternity admissions in these studies.

The grouping of cities and towns into 68 hospital service areas located in 6 regions of the State greatly facilitated the tabulation and analysis of hospital utilization data. Admissions to State and Federal military and veterans hospitals and to long-term or chronic institutions were not included in these studies. Admissions for out-of-State residents were segregated from those for persons residing in Massachusetts. The community residence of all but 220 patients was available in the 1945 study, and of all but 833 patients, or less than one-tenth of 1 percent of all admissions, in the 1955 survey. Data concerning the community residence of maternity patients (as determined by the count of newborn) were also gathered for each of the 2 years.

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Pattern of Admissions

In the 10-year period 1945–55, total hospital admissions for Massachusetts residents per 1,000 population increased from 109 to 124. Although there were 14 fewer general hospitals in the later year, the total number of admissions (including maternity cases) increased 22.2 percent, and maternity admissions increased 3.1 percent. The State's population in this decade increased 7.7 percent. In 1945, maternity patients constituted 20.0 percent of all general hospital admissions; in 1955, they represented 17.01 percent of the total admissions.

The greatest percentage increase in admissions occurred in hospitals located in the rural and urban fringe communities. This was true of maternity cases as well as total admissions (see chart). In fact, the increase in maternity admissions in these areas was strikingly greater than the increase in either of the other two types of communities. General hospitals in the large urban communities—Boston, Cambridge, Worcester, and Springfield—experienced the smallest increase in total hospital

admissions. Their increase in maternity admissions exceeded that in the small urban communities, but was nevertheless much smaller than in the rural and fringe areas.

These findings reflect to a great extent the shifting of population from the large cities to the less densely populated areas of the State. Another factor has undoubtedly been the increase in number of suitable beds available in the rural and urban fringe areas. Almost half of the general hospital beds in these areas considered nonacceptable in 1945 because they were located in obsolete or inadequate buildings had been replaced with acceptable beds by 1955 (*1*).

In comparison with the other two types of communities, the small urban areas did not experience an increase in general hospital admissions proportionate to their population growth. Also, their increase in maternity admissions was insignificant (0.2 percent). These findings suggest that an increasing number of residents of the small urban areas are using the hospitals in the large urban medical centers.

Study of hospital admissions according to residence of patients revealed that the rate of hospital use was generally greater for residents of the large urban areas than for persons residing in the small cities or in the rural and fringe areas both in 1945 and 1946. For residents of the large urban areas, admissions rose from 119 per 1,000 residents in 1945 to 134 in 1955. In the small urban areas, the admission rate increased from 104 to 119, while in the fringe and rural areas the admission rate rose from 107 to 121.

Special attention was drawn to two large urban communities and one small urban community which showed unusual changes in rates of hospital admissions over the 10-year period.

Percentage increase in population, total admissions to general hospitals, and maternity admissions, from 1945 to 1955, Massachusetts

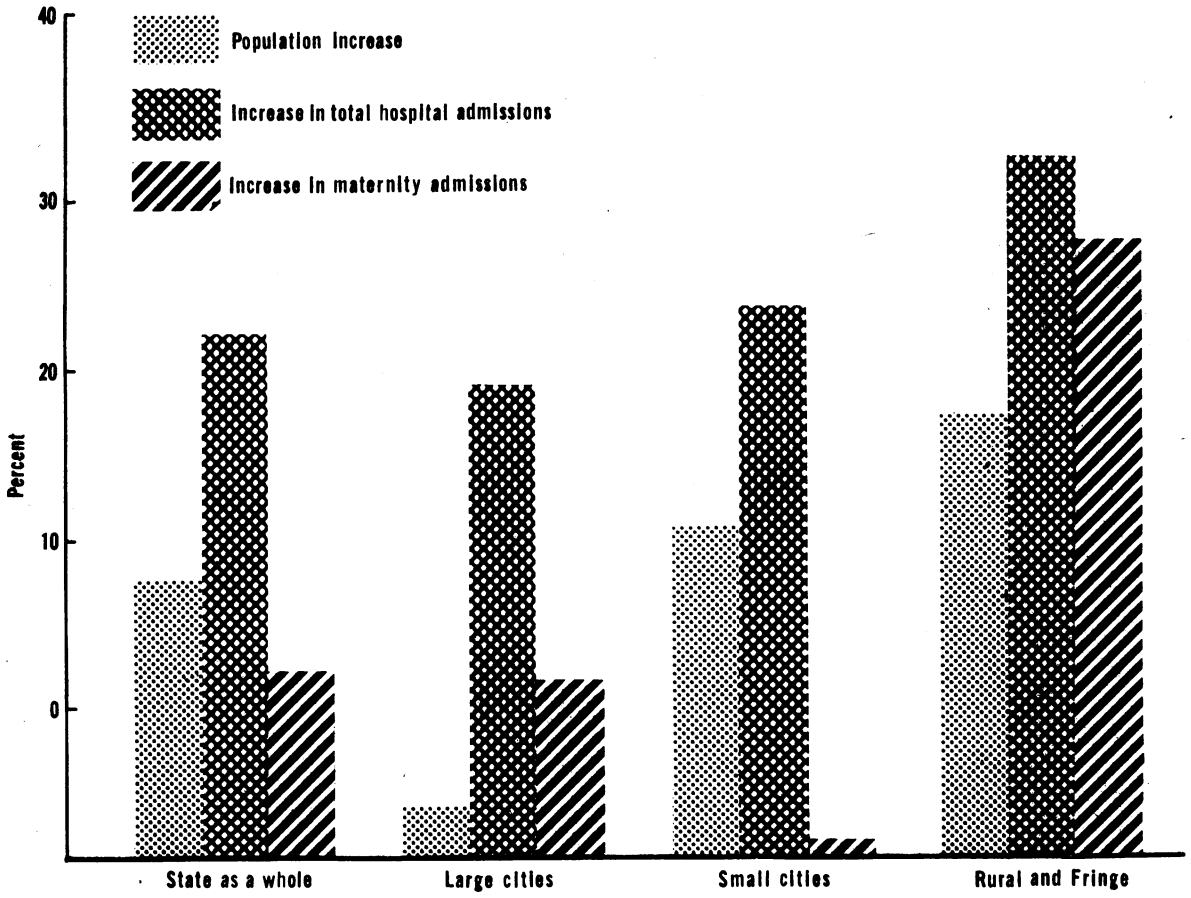

Table 1. Relation of general hospital admissions to beds available in selected Massachusetts communities

Communities	Hospital admissions per 1,000 population		Hospital beds per 1,000 population	
	1945	1955	1945	1955
Worcester	116	139	4.0	4.6
Springfield	121	118	3.7	3.2
Pittsfield	111	145	4.3	5.0
State as a whole	109	124	3.8	3.9

In the Worcester metropolitan area, hospital admissions went from 116 to 139 per 1,000 population, while in the Springfield metropolitan area, only 50 miles from Worcester, the rate dropped from 121 in 1945 to 118 per 1,000 population in 1955 (table 1). In the smaller city of Pittsfield, general hospital admissions increased from 111 to 145. Examination of the ratios of hospital beds to population in these three communities revealed a possible influential factor in these changes. In 1945 Worcester had 4 general hospital beds per 1,000 population, and Springfield had 3.7 beds per 1,000. However, in 1955, Worcester's bed ratio rose to 4.6, while Springfield's dropped to 3.2 per 1,000. In Pittsfield, the hospital bed ratio rose slightly more than in Worcester, from 4.3 to 5.0 per 1,000 population. Such a positive correlation between utilization of general hospitals and the number of beds available has been observed recently by Shain and Roemer (*2*).

Study of the extent to which residents used hospitals in their own areas or in other areas revealed little change between 1945 and 1955 (table 2). There was, however, a small increase (1.6 percent) in use of rural hospitals by residents of rural and fringe areas and a similarly small increase (1.4 percent) in use of large urban hospitals by residents of small urban communities. There was also little change in the hospitals used by out-of-State residents, who accounted for 4.5 percent of all admissions to general hospitals in Massachusetts in 1945 and 4.2 percent in 1955.

Data on hospital use in Boston suggest that residents of the city who migrated elsewhere in the State continued to use the city's general hospitals. In 1945 the population of Boston was 766,386, or 17.1 percent of the State's total. In 1955, the population was 41,684 smaller and constituted only 14.9 percent of the State's population. In the earlier year, 56.8 percent of the patients using Boston hospitals were residents of the city, whereas in the later year, admissions of Boston residents diminished to 50.2 percent of the total patients admitted. Conversely, patients residing elsewhere in Massachusetts constituted 40.9 percent of the patient load in 1955, as compared with 34.5 percent in 1945. (The remainder of the patients in each year were out-of-State residents.)

Summary and Discussion

Our studies thus far indicate that there has been a marked increase in use of general hospitals in Massachusetts between 1945 and 1955. In the State's four largest cities, hospital use increased substantially despite the fact that their aggregate population remained practically constant. The small cities and the rural and fringe communities experienced more marked increases along with relatively large population growth.

Hence, generally speaking, as the population has shifted from the cities to the less densely populated areas, hospital use has changed in the same direction. This relationship is true also of maternity admissions, at least in the rural and fringe areas. There are indications,

Table 2. Percentage distribution of patients according to residence, by place of hospitalization, Massachusetts, 1945 and 1955

Residence	Place of hospitalization					
	Large cities		Small cities		Rural and fringe areas	
	1945	1955	1945	1955	1945	1955
Large cities	91.5	91.7	7.2	6.7	1.3	1.6
Small cities	17.1	18.5	80.8	79.5	2.1	2.0
Rural and fringe areas	19.5	19.5	19.5	17.9	61.0	62.6
Out-of-State	67.9	68.9	28.6	28.3	3.5	2.8

however, that an increasing number of inhabitants of small cities, some undoubtedly former residents of the large cities, are continuing to use facilities of the large teaching and medical center hospitals. While the small cities experienced a 10 percent population growth in the 10-year period, their hospitals showed only a 0.2 percent increase in maternity admissions.

These studies give substantial support to the thesis that the volume of admissions to hospitals in a community is directly related to the number of beds available in that community. It is apparent that hospitals located in the rural and urban fringe areas have been so well accepted by the public that the use of "population size" as the main criterion for measuring need for hospital beds has been validated.

Other variables, not considered in these studies, have been suggested as factors also affecting hospital use. These include numbers and kinds of prepayment plans available, practice patterns of local physicians, and availability of outpatient services. Only after all such factors have been analyzed in relation to use of hospitals will it be possible to develop suitable criteria for determining adequate levels of hospital use and hospital bed needs in local communities.

REFERENCES

(1) Massachusetts Department of Public Health: Massachusetts State plan for the administration of Public Law No. 725. Boston, 1956, p. 12, table 7.

(2) Shain, M., and Roemer, M.: Hospital costs relate to the supply of beds. Mod. Hosp. 92: 71–73, 168, April 1959.

Rheumatic Fever Leaflet

HEALTH EDUCATION CASE HISTORY HEALTH EDUCATION CASE HISTORY HEALTH EDUCATION CASE HISTORY

Nine stages in the development of a leaflet on rheumatic fever recently published by a large industrial concern are described for *Public Health Reports* by a science writer who prepared it.

As a first step, it was agreed in consultation with the medical director's organization that an issue of the company's periodic health leaflet would be given to the topic of rheumatic fever.

Second, he read up on the subject in the latest medical books, in current medical periodicals, and in documents supplied by the American Heart Association.

Third, he attended as many meetings as he could where rheumatic fever was discussed.

Fourth, he showed a first draft and a layout of the proposed leaflet for comment to the American Heart Association, the local heart association, a medical consultant, and his wife.

Fifth, he incorporated the comments and criticisms received from these sources into a revised layout and text, which he submitted to the company for review and approval.

Sixth, changes suggested by the medical director's organization were made and the layout was approved by the company medical director.

Seventh, the text and layout were given to an artist, also engaged by the company, with suggestions for illustrations and colors as well as size specifications.

Eighth, the artist's layout and sketches were reviewed and okayed.

Ninth, all artwork copy was delivered to the company for printing and distribution.

This and similarly prepared leaflets on other health subjects of interest are distributed periodically to this company's employees throughout the United States. A survey has shown these leaflets to have popular appeal and acceptance by the employees. Requests for these leaflets come from students, teachers, nursing schools, health organizations, and others. A single request has called for as many as 300,000 copies. Since these leaflets are issued for employees rather than as a public service, they are supplied to the public only in limited quantities and then only when extra copies are available.